

PERMIT PART 4 TREATMENT OF HAZARDOUS AND MIXED WASTES

4.1 GENERAL CONDITIONS

Treatment of hazardous and mixed waste shall be conducted only at the permitted units identified as utilizing waste process code T04 and specified in Attachment J (Hazardous Waste Management Units), Table J-1.2 (Units Permitted for Treatment (Process Codes TO4 and XO1)). The Permittees are authorized to treat only those hazardous and mixed wastes identified by EPA Hazardous Waste Numbers (Waste Codes) listed in Attachment B (Authorized Wastes). The Permittees shall not treat hazardous or mixed waste in excess of the maximum capacities identified in Attachment J, Table J-1.2.

Hazardous and mixed wastes that are treated at the Radioactive and Mixed Waste Management Unit (RMWMU) and Auxiliary Hot Cell Unit (AHCU) include manufactured items and wastes generated from specific processes and activities. To ensure that proper and accurate waste characterization occurs, the Permittees shall use the characterization procedures outlined in Section C.3 of Permit Attachment C, as well as sampling and analysis, as appropriate.

Hazardous and mixed wastes that are treated at the RMWMU and AHCU include:

1. Solid items exhibiting the hazardous waste characteristics of ignitability and/or reactivity;
2. Solid items (including debris) exhibiting the hazardous waste characteristic of toxicity or containing spent solvents or commercial chemical products;
3. Liquid wastes and wastewaters exhibiting the hazardous waste characteristics of ignitability, corrosivity, or reactivity; and
4. Liquid wastes and wastewaters containing toxicity characteristic constituents and organic compounds.
5. Liquid wastes consisting of or containing spent solvents or commercial chemical products.

Treatment processes and the associated treatment goals at the RMWMU and AHCU are discussed in Permit Attachment A, Sections A.4.5 and A.5.4, respectively. The treatment processes include:

1. Chemical deactivation to eliminate the hazardous waste characteristics of ignitability, corrosivity, and reactivity;
2. Thermal deactivation to eliminate the hazardous waste characteristic of reactivity in reactive wastes, including explosives;
3. Amalgamation to immobilize elemental mercury into a solid, leach-resistant form;
4. Stabilization to immobilize hazardous waste toxicity characteristic metals or eliminate free liquids, or both;
5. Macro-encapsulation to immobilize hazardous constituents; and
6. Physical treatment to change the physical character of the waste in order to make it more amenable to subsequent treatment or storage, or to reduce waste volume.

The hazardous and mixed wastes to be treated at the RMWMU and AHCU are typically assigned one or more of the following EPA Hazardous Waste Numbers: D001-D011, D018-D043, and F001-F005. The EPA Hazardous Waste Numbers for hazardous and mixed waste to be treated at the RMWMU and AHCU are determined through the characterization procedures described in Permit Attachment C, Section C.3, in which process knowledge is supplemented by sampling and analysis, as appropriate.

4.2 DEPARTMENT APPROVAL

Approved treatment methods are described in Permit Parts 4.4 – 4.9 below. Prior to treatment by any method not specified in this Permit, the Permittees must submit to the Department for its review and approval a detailed treatment plan for each waste that is to be treated. The treatment plan shall describe, at a minimum, the wastes to be treated, the volume or weight of the wastes, detailed descriptions of the methods of treatment, and how treatment efficacy will be verified. Such treatment plans shall not include treatment by the Permittees using tanks, incinerators, boilers, industrial furnaces, surface impoundments, or land treatment unless such plans are submitted as a request to modify this Permit.

The Department expects within 45 days of receipt of a plan to notify the Permittees of the treatment plan's approval, conditional approval, denial, or the need to submit a permit modification request if the treatment method requires a permit modification. If the method of treatment does not require a modification of this Permit, and if the Department does not so notify the Permittees, the Permittees may implement the plan provided that all applicable requirements of 40 CFR Parts 264 and 268, including 40 CFR 268 Subpart D, and this Permit are met, releases of waste and treated wastes are prevented, and the health and safety of workers and the public protected from harm related to implementation of the plan. Nothing in this Permit Part shall be read to obviate the requirement for a Permit Modification if necessary pursuant to 40 CFR § 270.42.

A detailed description of the treatment methods subject to the requirements of this Permit, including this Section 4.2, are described in Permit Attachment A (Facility Description).

4.3 CONTAINMENT SYSTEMS

Containers in which treatment is conducted under this Permit Part 4 shall be subject to the requirements of Permit Section 3.6 (Containment Systems).

4.4 PHYSICAL TREATMENT

Hazardous and mixed wastes shall be treated physically at the RMWMU and AHCU to reduce waste volume and change the physical character of the waste to make it more amenable to subsequent treatment or storage, or both. Hazardous and mixed wastes that are physically treated at the RMWMU and AHCU generally consist of solid items that exhibit the hazardous waste characteristics of ignitability, reactivity, or toxicity and include unknown solids, debris, aerosol cans and other pressurized containers.

Physical treatment shall include only the following:

1. Reducing waste volume by using commercially available tools (e.g., hammers, screwdrivers, wrenches, pliers, saws, drills, cutters) to separate items with hazardous constituents from larger items or from each other, including removal of coating and filler materials.
2. Removing glues or resins by dissolution in containers (e.g., trays or pails) in order to facilitate separation of items with hazardous waste constituents from each other or from other items. Dissolution shall take place within a fume hood.
3. Reducing the size of waste items by using tools (e.g. mallets, cutters, etc.) to crush or cut items into smaller pieces.

4. Puncturing aerosol cans within a container to allow recovery of the contents. The liquid contents of the aerosol cans must be collected in a container, and any gaseous propellants must be filtered through a carbon or other appropriate filter attached to a container.
5. Releasing pressurized contents of containers other than aerosol cans (e.g., gas cylinders). Organic gaseous contents must be filtered through a carbon filter. All contents must be vented to a chemical fume hood with a high-efficiency particulate air filtration system.

4.5 MACROENCAPSULATION

Solid hazardous and mixed waste items, including debris, are treated by macroencapsulation at the RMWMU and AHCU to immobilize hazardous waste constituents.

The Permittees shall perform macroencapsulation in containers. Macroencapsulation shall consist of completely encasing waste within a polymer coating or concrete, or within a jacket of inert inorganic materials to immobilize wastes such as debris-type solids containing hazardous constituents by completely surrounding the waste with a leach-resistant coating.

The Permittees shall perform macroencapsulation using any one of the following:

1. Encasing the waste in concrete, within a larger container that serves as a mold.
2. Coating the waste with polymer agents within a mold. Polymers used for macroencapsulation shall be limited to asphalt, polyethylene, thermosetting plastics, and resins that can be polymerized under ambient temperatures in the presence of a catalyst. Equipment used for macroencapsulation may include molds, polymer extrusion equipment, and resin mixing equipment. In-drum macroencapsulation may be performed with the drum acting as the mold. Temperature control of polymer macroencapsulation processes is critical and shall be carefully maintained to assure that adequate coating occurs.
3. Placing the waste along with inert void-filling materials as appropriate inside a commercially available container made of inert or non-corroding materials such as polyethylene or stainless steel and sealing the container to encapsulate the waste. This method may not be used to treat D008 radioactive lead solids.
4. Placing the waste in a container consisting of an outer shell with a liner of inert or noncorroding material such as polyethylene or stainless steel, along with inert void-filling material as appropriate, and then sealing the liner to encapsulate the wastes. Outer containers and liners may be rigid or flexible.

For options (3) and (4) above, the Permittees may use containers of various sizes, depending on the volume and dimensions of waste items to be macroencapsulated.

4.6 STABILIZATION AND SOLIDIFICATION

Hazardous and mixed wastes are treated by stabilization at the RMWMU and AHCU to immobilize hazardous waste toxicity characteristic metals or eliminate free liquids, or both. Hazardous and mixed wastes that are stabilized at the RMWMU and AHCU generally consist of liquids, soils, and particulate-type wastes.

The Permittees shall perform stabilization in containers. Treatment shall take place within a fume hood when possible. Stabilization shall consist of binding hazardous metals so that the metals

become chemically a part of the matrix or are physically bound within the matrix to immobilize toxicity characteristic metals.

Stabilization agents for toxic metals may include Portland cement, pozzolans, thermoplastics, organic polymers, and clays.

4.7 WASTE TREATED BY CHEMICAL DEACTIVATION

Hazardous and mixed wastes are treated by chemical deactivation at the RMWMU and the AHCU to remove the hazardous waste characteristics of ignitability, corrosivity, and/or reactivity. Hazardous and mixed wastes that are chemically deactivated consist of solids or liquids, including laboratory chemical waste, process waste, and reactive hazardous wastes.

4.8 WASTE TREATED BY THERMAL DEACTIVATION

Hazardous and mixed wastes treated by thermal deactivation consist of reactive hazardous wastes that are solid items. Such wastes are treated at the RMWMU to remove the hazardous waste characteristic of reactivity.

4.9 WASTE TREATED BY AMALGAMATION

Mixed waste consisting of liquid elemental mercury is treated by amalgamation at the RMWMU to immobilize elemental mercury into a solid, leach-resistant form that has minimal potential for emission of mercury vapor.